

Remarks and Argument

Applicants note with appreciation that all of the 35 USC 112 rejections applied in the previous Office Action have been overcome. The remaining rejections are addressed below, under headings corresponding to those in the outstanding Action, after the following discussion of the amendments and their basis in the specification.

Claims 1 and 23-27, which are all of the independent claims pending in the application, have been amended to recite that the thermoplastic binder comprises a thermoplastic polyethylene, polypropylene or ethylene propylene copolymer resin or combination thereof. Support for the amendments is found in the paragraph bridging pages 22 and 23 of the specification and, in particular at page 22 line 36 to page 23 line 8, describing polyethylenes, polypropylenes, ethylene propylene copolymers and combinations thereof as particularly preferred thermoplastic resins of the thermoplastic binder.

Claim 24 has also been amended to recite that the thermoplastic binder that is present in solid form is present as a film, fiber, fabric, powder or combination thereof. This amendment finds basis at page 53 lines 3-21 describing solid forms of the thermoplastic binder, including films, fibers, fabrics, particulates and combinations.

In view of the foregoing, the amendments to the claims made herein are clearly supported in the description and do not constitute new matter.

Claim Rejections – 35 USC 103

Claims 1-5, 13-19, 21-27, 34, 38, 41 and 44 have been finally rejected as obvious from US 3,684,600 (Smedberg) in view of prior art which the Examiner has considered as admitted.

Reconsideration is requested.

As discussed more fully below, none of the rejected claims is obvious from Smedberg in view of the prior art considered admitted by the Examiner because Smedberg describes a carpet laminating process in which a hot melt adhesive formulation, not a thermoplastic binder, is used as a backsize adhesive or binder. The composition, application viscosities and application techniques of Smedberg are fundamentally different from those of the claimed process. There also is no basis in Smedberg from which the improved fuzz resistance and tuft lock achievable by use of stitch bind compositions in

conjunction with thermoplastic binders according to the claims would be expected by persons skilled in the art.

Smedberg discloses carpet lamination using a hot melt backsize adhesive formulation in which a lower viscosity hot melt or other adhesive precoat is used in conjunction with the hot melt backsize. Smedberg's hot melt backsize adhesive is described generally as an ethylene/vinyl acetate copolymer-based formulation that also contains one or more of a wax, filler and resin extender (Col. 6 l. 66-75), and in which other types of resins, such as polyethylenes, ethylene/acrylate or ethylene/methacrylate polymers can be used instead of or in addition to the ethylene/vinyl acetate copolymer. In greater detail, the reference describes these hot melt formulations as containing (A) about 10-35 wt% ethylene copolymer of which 15-40 wt% is copolymerized vinyl ester, lower acrylate or lower methacrylate; (B) about 10-25 wt% high melting point wax; and (C) about 15-75 wt% of a low softening point, aliphatic thermoplastic olefin-diene resin blended with a dicyclopentadiene alkylation polymer (Col. 7 l. 4-27).

Smedberg's hot melts are formulated so that they have Brookfield viscosities of about 5,000 to 50,000. In this regard, greater detail is found in the then co-pending application Serial No. 789,605, now US 3,583,936 (Stahl), cited at Col. 7 l. 4-6 of Smedberg. According to Stahl, the components of Smedberg's formulation are essential components (Col. 3 l. 42-48), and their proportions are important, with more than about 25 wt% ethylene copolymer content providing application temperature viscosities that are too high, wax content of at least 10 wt% needed for high softening temperature, and blended olefin-diene copolymer/dicyclopentadiene alkylation polymer resin extender content of at least 50 wt% needed for suitable viscosity.

Smedberg's backsize hot melt adhesive formulation clearly is not, and does not make obvious, the thermoplastic binder according to Applicants' claims. In contrast to the reference's hot melt formulations, in which up to 35 wt% of certain thermoplastic polymer components is used in combination with viscosity-lowering wax and resin extending additives, the thermoplastic binder according to the claims comprises a thermoplastic polyethylene, polypropylene or ethylene propylene copolymer resin or combination thereof.

Neither polypropylene nor ethylene propylene copolymer resins are even mentioned as components of Smedberg's formulations. Low molecular weight polyethylene waxes are mentioned in Smedberg (Col. 8 l. 43) and Stahl (Col. 4 l. 16-19) as suitable wax components of the hot melt formulations, but waxes are not thermoplastic resins and the polyethylene waxes of the references are not, nor do they make obvious, the thermoplastic polyethylene resins of the thermoplastic binders according to the claims. Smedberg's (though not Stahl's) broad description of hot melt formulations also mentions use of polyethylenes, ethylene/acrylates and ethylene/methacrylates instead of or in addition to its ethylene/vinyl acetate copolymers. However, with both Smedberg's and Stahl's specific disclosures of required vinyl ester, acrylate or methacrylate contents of the ethylene copolymer component considered essential by Stahl (and presumably by Smedberg in view of its reference to Stahl and lack of any data or teaching to the contrary), that mere mention of polyethylene is at best an invitation to experiment and not a fair teaching from which persons skilled in the art would be led to replace the required copolymers. In any event, Smedberg's hot melt formulation, even if its ethylene copolymer were replaced by a polyethylene, is not the claimed binder comprising thermoplastic polyethylene resin because of formulation's significantly greater content of the required wax and resin extender components and their viscosity lowering effects.

The claims also are unobvious from Smedberg in view of the art considered admitted by the Examiner as applied in the instant rejection because application of a thermoplastic binder by extrusion or in solid form is not obvious. Smedberg states, without further elaboration, that its hot melt adhesive backsize "can be applied by means other than applicator rolls so long as sufficient amounts of these ingredients are deposited onto the carpet backside in the proper sequence;" however, only application with applicator rolls is described in the reference (Col. 3 l. 2-10; Col. 8 l. 12-21) and there is no mention of any technique, equipment or other aspect of any "means other than applicator rolls." While application of thermoplastic binders by extrusion or in solid form is generally known, as described at page 3 of Applicants' specification, there is no basis in either Smedberg nor the prior art discussion in the specification for applying that knowledge to Smedberg's low viscosity

hot melt adhesive backsize formulation. To the contrary, persons skilled in the art would clearly understand and recognize that Smedberg's low viscosity hot melt backsize adhesive formulation, with its viscosity-depressing wax and low softening point resin extender components, is applied by liquid application techniques, not in solid form or as an extruded melt. Application of thermoplastic binder in solid form as film, fiber, fabric, particulates or a combination thereof as recited in claim 24 is unobvious for the added reason that there is nothing in Smedberg to indicate that its hot melt backsize adhesive can be formulated in any such form.

Referring to claim 5 and the specific discussion thereof in the instant rejection, the rejection's reference to Smedberg's teaching of thermoplastic binders with a melt index of 2 ignores that the reported melt index is for only the ethylene/vinyl acetate component of Smedberg's hot melt backsize formulation and that that component accounts for only 25 wt% of the formulation. In any event is not a thermoplastic binder resin according to the claims as amended. Further, the Examiner's apparent position that any melt index within the range recited in claim 5 would be obvious from Smedberg's disclosure of polymers ignores not only that Smedberg formulates minor amounts of polymer with viscosity-depressing waxes and resin extenders, but also the reference's specific requirement for hot melt backsize viscosities of 5000-50,000 cps at application temperatures. By way of comparison, over the range of Smedberg's disclosed 250-330°F backsize hot melt application temperatures (Col. 7 l. 28-32), the thermoplastic binder resins used in most of the examples of the subject application are solids at 250°F and melts with viscosities from 100,000 to 500,000 cps over the range of 270-310°F.

Referring to claims 16 and 17 and the specific discussion thereof in the instant rejection, the Examiner's position appears to be that use of a cross-linkable polymer in Smedberg's precoat adhesive would be obvious because such polymers are known for use in aqueous carpet latex formulations. That cross-linkable polymers are known as components of conventional carpet latexes is not basis for substituting them for Smedberg's disclosed polymers. Moreover, the position stated in the rejection ignores impact of crosslinkable species on Smedberg's specific requirements for low precoat viscosities. With precoat application temperatures according to Smedberg being as high as

250°F (Table 3 at Col. 8 l. 65-70), crosslinking of a crosslinkable polymer could significantly increase viscosity, as well known by persons skilled in the art.

Claims 6-8 and 20 have been finally rejected as obvious from Smedberg and the prior art considered as admitted by the Examiner taken with Kato and Bogdany. Smedberg is applied as in the rejection discussed above and the secondary references are relied on for their teachings of methods for applying liquids.

Reconsideration is requested.

Claims 6-8 and 20 are ultimately dependent from claim 1 and nonobvious over the cited references for reasons discussed above in connection with the obviousness rejection of claims 1-5, 13-19, 21-27, 34, 38, 41 and 44.

In addition, techniques disclosed in Kato for application of its crosslinking, foamable formulation, or in Bogdany for its corn syrup-containing formulations, cannot be substituted for those actually disclosed by the primary reference without consideration of its express requirements for precoat adhesives. Bogdany's formulations are reported to have viscosities of 55-220 poise (= 0.055-0.22 cps) at 100°F. In contrast, Smedberg reports precoat viscosities of 2-2000 cps. On their face, Kato's teachings, being directed to crosslinking, expandable emulsions for stiffening laminates, are irrelevant in the context of Smedberg's precoat.

Claim 20 is unobvious from the cited combination of references for at least the additional reason that Kato's and Smedberg's adhesives are used for widely divergent purposes and there is nothing in either suggesting use of specific materials disclosed by Kato in Smedberg's precoat. More specifically, Kato's discloses manufacture of laminated sheets, said to have improved stiffness, shielding properties, heat resistance and crack resistance, in which a crosslinking emulsion containing expandable polystyrene particles is coated onto the back of a sheet and the assembly is heated to expand the polystyrene and cure the crosslinking polymer (Col. 4 l. 5-38). Kato's formulations are different in composition, usage and purpose from those of Smedberg. In that context, the fact that Kato discloses styrene acrylate polymers as crosslinking polymers is irrelevant for Smedberg's purposes.

Claims 9-12, 35-37, 39, 40, 42, 43 and 45 have been rejected as unpatentable over Smedberg and the art considered admitted by the Examiner taken with Bieser.

Reconsideration is requested.

As above, all of these rejected claims are ultimately dependent from independent claims 1, 25, 26 or 27 and are nonobvious for the reasons discussed above in connection with the obviousness rejection of those independent claims.

In addition, combination of Smedberg and Bieser according to the rejection is improper because Smedberg is directed to manufacture of carpets using hot melt adhesives while Bieser uses an extruded homogeneously branched ethylene polymer as a thermoplastic binder. Further, Smedberg's hot melt process is described and demonstrated only with reference to primary backings in the form of woven jute and spunbonded polypropylene, both of which present significantly greater fiber surface for adhesion of binders than the woven fabrics of the tufted backings of the rejected claims. Neither Smedberg, Bieser nor the art considered admitted by the Examiner provides basis for an expectation that Smedberg's hot melt backsize would be effective with woven polypropylene backings according to these claims, and especially backings in the form of fabrics woven from polypropylene tapes, with their generally flat, smooth surfaces and known poor affinities for certain adhesives.

Claims 1-5, 9-15, 18, 19, 21-27 and 34-45 have been rejected as obvious from Bieser in view of Smedberg under 35 USC 103, with Bieser cited as disclosing the claimed process except for the claimed stitch bind viscosities and application rates which the rejection purports to find in Smedberg.

Reconsideration is requested.

While Bieser is directed to carpet manufacture in which a thermoplastic binder, in the form of an extruded coating of a specific homogeneously branched linear ethylene polymer, is used, Smedberg discloses carpet manufacture using a hot melt adhesive backsize, as discussed above. Bieser itself distinguishes hot melt lamination processes, specifically noting that their melt strengths are too low for application by extrusion, at page 5 lines 19-28.

In view of basic differences in Bieser's and Smedberg's respective methods of carpet lamination, substitution of the precoat viscosities and application rates from Smedberg's process into Bieser's disclosure with respect to application of aqueous dispersions is inappropriate because it lacks motivation in the art. Bieser specifically teaches dispersion viscosities and application rates for his thermoplastic binder process that well exceed those disclosed by Smedberg. Persons skilled in the art clearly would have no motivation to discard those express teachings in favor of the precoat adhesive viscosities and application rates of Smedberg, which are not only entirely outside the ranges disclosed by Bieser, but disclosed by Smedberg in regard to and in conjunction with use of a different form of adhesive and lamination process. Moreover, Smedberg's own examples demonstrating effects of aqueous precoat on scrim bond weigh against application of his teachings to Bieser.

Claims 6-8 and 20 have been finally rejected as obvious from Bieser and Smedberg in view of Kato and Bogdany.

Reconsideration is requested.

These claims, ultimately depending from claim 1, are nonobvious over the cited references for reasons discussed above in connection with claim 1. Also as discussed above in connection with the rejection of claims 6-8 and 20 based on Smedberg taken with Kato and Bogdany, application of the respective reference's teachings to one another must take into account their actual teachings. Bogdany's corn syrup-based formulation and Kato's cross-linking, expandable polystyrene-containing adhesive for stiffening laminated sheets are no more applicable to Bieser taken with Smedberg than they are to Smedberg itself given differences, inconsistencies and conflicts in the compositions of the references and purposes for which they are said to be used.

Finally, claims 16 and 17 have been rejected as obvious in view of Bieser taken with Smedberg and the art considered admitted by the Examiner.

Reconsideration is requested.

Claims 16 and 17 are dependent from claim 1 and unobvious for reasons discussed above in connection with the rejection of that claim. Lack

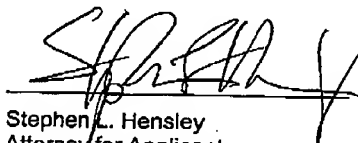
of motivation to combine Bieser and Smedberg is discussed above in connection with the rejection 1-5, 9-15, 18, 19, 21-27 and 34-45 and is applicable to the instant rejection as well.

As discussed above, Smedberg does not disclose crosslinkable polymers or use of cross-linking agents in its precoat adhesives. To the contrary, such materials would be contrary to, or pose complexities not contemplated in any way by, Smedberg in view of its specific requirements for low viscosity of its precoat and application thereof at elevated temperatures, at which crosslinking could significantly affect viscosity. Bieser specifically notes difficulties of conventional crosslinking or crosslinkable latex binders with regard to both lack of moisture barrier and complicating carpet recycle at page 4 lines 4-9. In the context of such teachings, persons skilled in the art would not be led to use cross-linking or crosslinkable components in the process according to Bieser because such components when crosslinked, as in finished carpets made with the use thereof, tend to absorb water, as discussed at page 2 lines 17-25 of Applicants' specification, and also can impede reprocessing of carpet scrap and spent carpets, as discussed at page 3 lines 20-26 of the specification. Accordingly, neither Smedberg nor Bieser supports the instant rejection of claims 16 and 17.

Conclusion

In view of the amendments made herein and the foregoing reasons for reconsideration of the rejections, it is submitted that the claims of the subject application are patentable over the cited references and prior art considered by the Examiner as admitted, and that the application is in condition for allowance. Such action is respectfully requested.

Respectfully submitted,



Stephen L. Hensley
Attorney for Applicants
Registration Number 28,426